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ABSTRACT

Two reports discuss pilot projects using the Computer Assisted Distance Education Telecommunication Project (CADET) in Edmonton, Alberta. The first describes two studies that investigated the feasibility of telephone communication between two or more microcomputer (Apple) operators using an Amdahl mainframe computer as an intermediary. The results reported suggest that the CADET system is effective in enabling teachers to promote pupil performance with new subject matters. Seven references are listed and an appendix outlines steps in Visiterm communication between the Amdahl and Apple computers. The second report is concerned with Phase 2 of the CADET project, in which the new CADET file system was field tested through a linkage between the Amdahl computer at the University of Edmonton and four higher education institutions. Problems encountered, recommendations, and advantages are listed. Appendices include "The CADET Operations Manual," which covers the CADET system, Visiterm, the communication card and telephone modem, how to sign on and off Amdahl, receiving a message, text editor (prepare a message), text format, sending a message, confidential communications, electronic mail, and some common problems. A trouble shooting check list is included. (LMM)

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A Report To The

Program Planning and Development Branch,

Alberta Department of Advanced Education

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June 15, 1983

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THE CADET PROJECT

COMPUTER ASSISTED DISTANCE EDUCATION TELECOMMUNICATION

FOR POST SECONDARY EDUCATION IN ALBERTA

REPORT #1

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THE CADET PROJECT

COMPUTER ASSISTED DISTANCE EDUCATION TELECOMMUNICATION

FOR POST SECONDARY EDUCATION IN ALBERTA

This project was an attempt to determine the feasibility of telephone communication between two or more microprocessor operators using a mainframe computer as an intermediary. The value of such an interaction is:

a) The convenience of sending or receiving information at personally convenient times.

b) The use of available telephone services without the need for special lines.

c) The ability to access a data base in the mainframe.

d) The potential for an electronic mail system.

e) The potential for distance education use.

In this project, Apple microcomputers and the University of Alberta's Amdahl mainframe computer were used: the Apple was used since it is the most common one now used in Alberta schools, and the Amdahl is the most powerful mainframe available in this area.

Since the researchers' primary interest is the use of this procedure for distance education, the project was named Computer Assisted Distance Education Telecommunication - (CADET).

The researchers' interest in CADET was due to several factors. Instructors and students could communicate long distance by CADET at comparably lower telephone costs since questions and comments can be prepared on diskette and uploaded to Amdahl, and material downloaded from the Amdahl can be saved to diskette. This allows participants to minimize

both telephone and mainframe computer charges. It allows participants to have a diskette copy of the communications to examine at their convenience. The flexible user times permits an instructor or a student to look up answers to questions and reply to them at times convenient to them without having to coordinate schedules to be at the computer or telephone at the same time.

An additional savings in telephone costs is the use of Datapack. This is a system that when locally dialed (if the service is locally available) allows communication with any mainframe computer serviced by it at local telephone charges.

In developing this project the researchers were influenced by the pioneering work of the Alaska Department of Education's Educational Telecommunications for Alaska project (ETA). This project was designed in 1976-77 and consists of three parts: an electronic mail system called Administrative Communications Network; a computer data base search called Alaska Knowledge Base System; and a computer assisted instruction function, Individualized Study by Telecommunications (Alaska Department of Education, 1982). Presently, the electronic mail system is the most developed aspect of ETA. The researchers wish to acknowledge the work of ETA in stimulating similar applications in this jurisdiction.

Procedure:

Two groups of teacher volunteers participated in this feasibility project. The first group of two teachers located in one school was an initial pilot to examine the procedure and the commands involved to see if any major problems would arise. The second phase involved another, larger, group of eight teachers in three different schools.

The first round was from January 12-31, 1983. The second round was February 11 to March 4, 1983. All teachers had a hands-on computer use instruction session at the University of Alberta Faculty of Education Computer Laboratory given by the researchers. The sessions were approximately two hours. Each group had its own session.

All participants were required to keep a log book of their time in up and downloading to and from the Amdahl. The communications between the participants were saved to diskettes and a print copy made of them. In keeping with pervious distance education research (Kirman and Goldberg, 1979, 1981, 1982), the teachers were required to teach about something relatively new in order to encourage their use of the communication medium to obtain further information and maintain contact with an instructor. As in the previous research, Landsat satellite maps were the items for the teachers to teach to their pupils. Teachers were also provided with an instruction text for Landsat imagery (Kirman, 1978). Pupils were in division two (grades 4-6) of the Edmonton Public and Separate schools.

The project was monitored by the log books, a teacher questionnaire, the testing of the pupils for their knowledge of Landsat imagery, telephone contact with the teachers if a problem arose, the hard print copies of the communications between participants, and the observations of the instructor. The teacher questionnaire and the pupil testing were administered after the conclusion of each round. In the first round a teacher questionnaire was not administered, rather the researchers personally interviewed the teachers. For both rounds, Kirman of this research team was the instructor.

Software:

This project required three sets of software: one set to deal with the Apple to Amdahl communications, and another to command the Amdahl; the third item was a text editor to store and recall material to and from the

diskettes. For Apple-Amdahl communications, the Visiterm program was used. This has to be specially modified for Apple-Amdahl use (see Appendix A). The software for commanding the Amdahl was built into the Amdahl. This is the Michigan Terminal System (MTS). All participants used Executive File Editor as the text editor. It was selected as it is one of the easiest text editors to use, and requires a very short time to learn how to use it.

All schools received one Visiterm diskette, and each participant received a diskette with the text editor on it to compose, receive, and store data to diskette. The log book received by the teachers contained detailed step by step instructions for up and downloading, using the text editor, and trouble shooting.

Hardware:

In addition to the Apple computers provided by the schools of the participating teachers, a California Communications Card for insertion into the Apple, and a CAT telephone modem were provided for each Apple. The CAT modem was used since the schools all had hard wired telephones, so that an acoustical rather than a direct circuit plug-in modem was required.

Field Activity:

A. The First Round -

The two teachers in the first round were asked to transmit and receive via the CADET system each day. Since the Amdahl is available from 8:00 a.m. to 4:00 a.m. the next morning, setting times for transmissions was quite flexible. In order to allow the instructor time to prepare answers to questions and upload them to the appropriate file, 8:00 to 10:00 a.m. was reserved for the instructor. In that time he downloaded any questions from the teachers

and prepared the answers. Any time after 10:00 the teachers could access the Amdahl for their answers and upload additional questions. A question uploaded by a teacher would have an answer for it by 10:00 a.m. the next morning. Theoretically, this would permit the teachers to have access to the mainframe computer at their convenience during the day, and permit them to add additional questions or comments at the end of the school day if they wished. During the first round, this was quite acceptable to the teachers.

The teachers were provided with their own passwords and sign-ons for the Amdahl. Two files were set up for the project in the Amdahl: QUESTIONS and ANSWERS. QUESTIONS was used by the teachers to upload their questions. ANSWERS was used by the instructor to upload the answers. The commands used by instructor and teachers were the specific MTS Amdahl commands to upload and download. The command to upload required the command notation to append the information to whatever was in the file already, otherwise a new uploading would print over what was in the file and erase that part of it.

Prior to 10:00 a.m. the instructor was responsible for emptying the QUESTIONS and ANSWERS file for the new day, and uploading the new information for ANSWERS file.

Since more than one person was using the files it was necessary to establish format for the messages. This would identify from whom and to whom the messages were sent. A sample format is as follows:

****

John to Joe Feb. 18, 1983

I have started to use the Landsat maps with the class. What is the dark area to the west of Winnipeg? Also, can the Winnipeg airport be seen?

****

The format identifies the sender, the recipient, the date transmitted, and the row of asterisks demarcates the message from the next one.

The purpose of using common files for all participants was twofold: first, it was easier for the instructor to up and download a common file than individual files; second, this procedure simulates to some extent the classroom interaction in which all hear each others' questions and answers. It also had the benefit of not having to repeat the same answer many times, by instructing a teacher to look at another party's answer. In addition, it had the benefit of allowing a bulletin message to all teachers at the beginning of the file - again avoiding the need to repeat the same information.

The first round went quite smoothly with a few minor command problems promptly solved. At the conclusion of the round the teachers noted that it had been fun and there was no pressure involved. They felt that the CADET procedure would be of value to distance education, depending upon the nature of the course. However, they believed it was not a substitute for face to face instruction. They suggested that the commands be simplified since it was too easy to make a typing error, and that the file editor was limited in the number of lines it could hold. They felt that it was good that both parties to a communication did not have to be at their computers at the same time.

Data from round one pupils were not considered since they were a self selecting group with a consequently higher class average than round two classes.

A problem that occurred was the difficulty of signing on to Amdahl during heavy user periods, especially around the lunch hour. One teacher would ring up Amdahl, leave the computer on and periodically check back to see if Amdahl was calling for his password.

B. Round Two -

In round two all items were the same except:

1) Eight teachers were used
2) There were simplified commands
3) The teachers were in three schools
4) Each teacher had a personal file
5) Common question and answer files were not used

Separate files were used in this round to compare and contrast their use with the common file system used earlier. The simplified commands used source files that contained commands in that file. Thus the actual MTS commands for up and downloading were given by accessing that file. The difference between the commands were quite striking. For example, compare the commands used for uploading:

Round one - copy *source* to q4g2:landsat-q(*L+1)

Round two - source mary-up

The round two command activates the file called mary-up which contains the command to upload a diskette to teacher Mary's file appropriately named mary also. The use of words rather than a combination of words and numbers for the teacher sign-ons also helped to avoid user errors and made the item easier to remember.

A technical difficulty surfaced in round two that caused much frustration among many of the participants and eventually led to a withdrawal of teachers in one school. The problem was a line voltage fluctuation in the telephone that kept interfering with the communication transmissions. It was traced to the use of a telephone linked to another telephone. When the teachers tried to link with Amdahl, if another party lifted the other telephone, it caused a line voltage change which in many cases severed the Apple-Amdahl connection. The telephones in question were the button variety that allow several incoming lines to be selected by pressing the button for that line. Although the other party using these interconnected telephones was on a different line, it still interfered with the transmission.

The problem arose in two of the three schools. In one, the situation had reached the point of frustration and the participants were dropped from the main project, although allowed to continue to use the CADET materials in an informal communication procedure not linked with the satellite map instruction. One of these three teachers wished to drop from the project due to personal time commitments conflicting with the project. This reduced the number of project teachers to five.

In the other school in which telephone voltage problems were encountered, the teachers waited until the end of the day when they could be sure that no one else would use the other telephones. It was then that they transmitted and received data.

One teacher in the first school was unable to use the computer later in the day and might have participated if Amdahl went on line earlier in the morning than 8:00 a.m.

There was no difficulty in using the source file commands. The use of individual files did provide difficulty for the instructor. Much time was spent in having to individually upload to each file. In the previous round, one uploading was sufficient. A special source command was developed to collect all teacher files into one file. This allowed all teacher files to be downloaded at once from the collection file. Another instructor source file was created to send the same information to all files. Thus a bulletin could be inserted in all teacher files. This overcame the need to upload the same information to all teachers.

Regretfully, the line voltage problem coupled with some difficulty in gaining access to the schools' Apple computers took its toll in reducing the regularity with which the communications were made. The technical problems added an element of frustration since the teachers were working with a new

teaching item, the Landsat images. This was not conducive to the high morale exhibited by the teachers in the first round. There, they had access to a computer in an office, and the telephone did not give them any problems.

The second round highlighted the impact a technological flaw can have on a project of this nature and showed the importance of voltage changes in computer transmissions. This was noted in the number of times reported in log books that each teacher used the CADET system. In the first round where no telephone problems were reported, the two teachers used CADET for a combined total of 34 times. In the second round, the two teachers in the school that had no telephone problems used CADET for a total of 37 times. But in the other school with telephone problems, three teachers used CADET for a total of only 25 times.

Pupil Testing:

Pupil performance in interpreting Landsat imagery was utilized to monitor the effectiveness of the CADET telecommunications used as a substitute for face to face in-service.

Pupil results were essentially similar to those obtained in an earlier study using the same achievement test and testing procedures (Kirman and Goldberg, 1982) in which actual inservice was provided to the teachers of the pupils. Thus, in the present study the 131 grades four, five, and six pupils averaged 72.8% correct responding on the Landsat test. In the earlier study the corresponding average for two groups were 73.6% and 76% correct responding on the same test.

The essential similarity of results of the two studies strongly supports the conclusion that the CADET system appears effective in enabling teachers to promote pupil performance with new subject matter.

It was also found that there was a positive correlative between the scores of the children on the achievement test, and the number of times their teachers used the CADET system (Table 1).

TABLE 1

CORRELATION BETWEEN TEACHER USE OF CADET SYSTEM

AND STUDENT LANDSAT ACHIEVEMENT TESTS

Teacher CADET use: number of times	Achievement test class average	Grade
6	7.68	4
7	9.49	5/6
12	9.57	6
16	10.46	5
21	10.60	6

$r = .84$
$p < .05$ (3 df)

Teacher Evaluations:

The five teachers who completed the project anonymously filled out an evaluation form similar to that used in Kirman and Goldberg (1982). The results may be summarized as follows.

1. Four of the five teachers reported that they spent considerably more time in preparing to use and actually using the telecommunication system than they did in studying the handout materials provided and in teaching pupils.

2. Much of the time loss resulted from problems in the system, having to wait to gain access to a telephone, having to wait to gain access to the mainframe computer.

3. Several teachers reported frustration about having to wait 24 hours for a reply to their questions, and were also frustrated by not having access to the mainframe between 8:00 a.m. to 10:00 a.m.

4. In spite of the problems noted in 1 to 3, all five teachers rated the system as good or very good for providing opportunity to "raise questions and bring up problems arising from your undertaking something new". Four of the five teachers rated the system as good or very good for the purpose "of permitting you to interact with your instructor".

5. Most significantly in response to the question of whether they would opt for microcomputer delivery or some other system if they were involved in further training in Landsat - three indicated a clear preference for microcomputer delivery and a fourth preferred microcomputer combined with a workshop in Landsat. Only one of five rejected microcomputer delivery.

The above results suggest that while the microcomputer system was perceived by the teachers as fulfilling the basic function expected of it, there was excessive frustration and time loss involved in utilizing the system. The fact that four of the five teachers would opt for microcomputer delivery in further training suggests that they perceive considerable potential in the system.

In dealing with the above comments the following will be of value:

1. The telephone voltage problem can be overcome with single line telephones.

2. The difficulty with heavy Amdahl traffic delaying users is a function of upgrading the mainframe to cope with such demands. Presently, it may be coped with by signing on at light traffic times.

3. The restriction of student CADET use during 8:00-10:00 a.m. can be corrected by using self emptying personal files. Thus, accumulated messages will remain available for the user until downloaded, at which time the file will automatically empty. In case of aborted downloads, a back-up file holding the file contents can be used to retrieve the lost data. Kirman and Goldberg have developed such a system which will be implemented in the second phase of this project.

4. Since instructors would not be limited to certain times for downloading and uploading using #3 above, answers to questions could be made the same day.

CADET Technical Considerations:

The following are findings and conclusions drawn from the above two CADET rounds:

1. Telephone connections must be monitored for line voltage changes before computer transmissions are made. Button telephones should be avoided for computer transmissions. The telephone lines must be free of voltage changes.

2. Commands for MTS should be as uncomplicated as possible. Avoid numbers and letter number combinations in favor of words. Use source files wherever possible to avoid human error in typing in commands.

3. The same text file editors should be used by parties communicating with each other. A difference in text file editor line formats and the manner in which they treat incoming text files could cause a problem. In general it is advisable to standardize software used by all parties.

4. When using the CAT modem with Datapack, the Visiterm should be set to half duplex. The CAT modem should be left in full duplex mode both for direct Amdahl communications or through the Datapack system.

5. The Visiterm program can be set to Amdahl default for user convenience. (Appendix A)

6. In preparing text files to be sent to Amdahl, the first character in a line should not be a number. A number as first character in a line is read by Amdahl as a carriage control and will be omitted. This is critical in the transmission of numerical data. This may be overcome by the M.T.S. command LIST instead of COPY for downloading, but the file line numbers will appear.

7. The text file editor used in this project is limited. Word processing programs would give better service regarding format and the number of lines they can hold. The Magic Windown (Artsi Inc.) program is recommended because of its ease of use with the Apple computer without any additional peripherals.

8. All software should be standardized between users.

Applications:

A) Post Secondary Education -

The CADET procedure utilizing Apple computers and the University of Alberta's Amdahl mainframe computer can be utilized for instructor to student communications. These can be either tutorial, small group, and larger group instruction. The maximum number of students in any group is limited by the amount of time the instructor is prepared to spend on the course.

Courses involving field work in which the student transmits field data for the instructor to examine lends itself to this approach. Where both students and instructors are in the field, communication can be maintained by CADET.

A student involved in thesis or dissertation writing can make use of CADET, as the student can send copies of written materials for the supervisor to examine without the time delays and possible loss in the mail. The material can be commented upon and similarly transmitted to the student.

The procedure can also be used for post graduate professional instruction where practitioners can keep in contact with the latest in their fields. Networking systems could be established where those with similar interest can maintain liaison and share information.

And, finally, the earlier mentioned computer data bases can be set-up with information and computer assisted instruction programs that can be downloaded by users.

It should be understood that if a post secondary education institution prepares a course using the CADET procedures, that additional funding would be needed for the extra time involved in preparing and delivering the course; especially so if there was a large number of students involved.

B) Provincial Implementation -

Widespread CADET use is limited by the numbers using the Amdahl at any time. Usually when the number begins to go slightly above sixty, at this writing, the Amdahl slows down and has at times crashed. This might be overcome by either upgrading Amdahl to handle more users or using feeder computers in other areas of the province that will accept local transmissions, and at given times a day up and download files for that district to and from the Amdahl (Note 1). With the province divided into computer districts, e.g., 10, this might be a feasible solution.

However, a preliminary consideration would be the comparative costs of upgrading the Amdahl as against the cost for a series of smaller computers in the field.

The use of CADET would be enhanced if special education rates were applied to it by Alberta Government Telephones. This might depend upon which increased user system would be established. A series of local smaller feeder computers would minimize long distance telephone rates. In addition, the use of the system during low rate periods would further reduce costs.

Should province wide CADET application be undertaken it is recommended that each institution have one person specially trained to operate this system, and be responsible for training others to use it. With widespread use, especially with the development of simple one key reserved functions for up and downloading, it is possible that CADET use could eventually become as user easy as present telephone use.

The potential for every school in Alberta to have a mainframe file, as well as the various government departments, would allow the electronic transfer of data between the various levels, as well as allowing school to school communication. The use of shared computer assisted instruction files would permit the use of one software item to be shared by all. However, this latter item should be negotiated with software developers because of copyright concerns.

The future:

With the development of fiber optic telephone communication and the use of very small computers such as the Radio Shack model 100, (TRS-80, 1983) and others such as those made by Hewlett Packard, as well as the lower costs of these smaller computers, the possibility of students

receiving or purchasing a computer becomes feasible. Combined with the increased speed of delivery of the communication with laser coupled fiber optics, the potential for delivering larger blocks of information in short bursts expands the system for library type functions (Thomsen, 1983). Thus, not only could a larger body of users be reached, but these users would not be limited by lack of library services in their areas (Note 2).

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Notes

1. The feeder computer idea was suggested by S. J. Thissen, Project Director, Alberta Education Computer Technology Project, in a discussion with Kirman about the CADET PROJECT, April 8, 1983.

2. The Thomsen article suggests a transmission speed of 420 million bits per second which could send a 30 volume encyclopedia's contents in one second having only a single error.

APPENDIX A

Visiterm Communications Between Amdahl and Apple

A. Dumb Terminal Communication:

1. Set Visiterm to full duplex unless Datapack is being used. With Datapack set Visiterm to half duplex.

2. Change Options page on Visiterm as follows:

   EOB CHAR = $0D RET
   ACK CHAR = $3E >
   STOP CHAR = $0A <J>
   START CHAR = $3E >
   CURSOR = +7

   Set the letter width to five + marks wide.

B. Up-loading to Amdahl from Apple

1. As above in A.

2. Set F page PROTOCOL to EOB-ACK.

C. Down-loading to Apple from Amdahl

1. As above in A.

2. Set F page PROTOCOL to STP-STRT.

The authors would like to thank Mr. Rick Roder, Faculty of Education Computer Laboratory Supervisor, for his aid in preparing the above information.

A Report To The

Program Planning and Development Branch,

Alberta Department of Advanced Education

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June 18, 1984

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THE CADET PROJECT

COMPUTER ASSISTED DISTANCE EDUCATION TELECOMMUNICATION

FOR POST SECONDARY EDUCATION IN ALBERTA

REPORT #2

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COMPUTER ASSISTED DISTANCE EDUCATION

TELECOMMUNICATIONS

REPORT #2

This report is concerned with phase 2 of the CADET project. In this phase the new CADET file system was field tested. The Amdahl computer at the University of Alberta in Edmonton linked Edmonton with Calgary (University of Calgary Faculty of Education), Lethbridge (University of Lethbridge Faculty of Education), Grande Prairie (Grande Prairie Regional College) and Ft. McMurray (Keyano College). Participating from Edmonton were a representative from Athabasca University and the Alberta Department of Education as well as the group leader J. M. Kirman of this research team.

Participants received an acoustical telephone modem, cable and communication card, a Visiterm communications program and a text editor. The Visiterm program was set to Amdahl default (Appendix A). Participants also received a CADET operations manual (Appendix D) and a CADET Ready Reminder Card (Appendix B). Participants used the CADET file system in the Amdahl for communications (Figure 1 and Figure 2). The CADET file system operated with only six simplified commands based on "source" files in the Amdahl. This eliminated any need for knowing how to use the Amdahl Michigan Terminal System (MTS) commands. It prevented user command errors and allowed one simple command to activate a source file that contained the necessary MTS commands (Appendix C).

CADET SYSTEM
MICRO TO MICRO VIA MAINFRAME

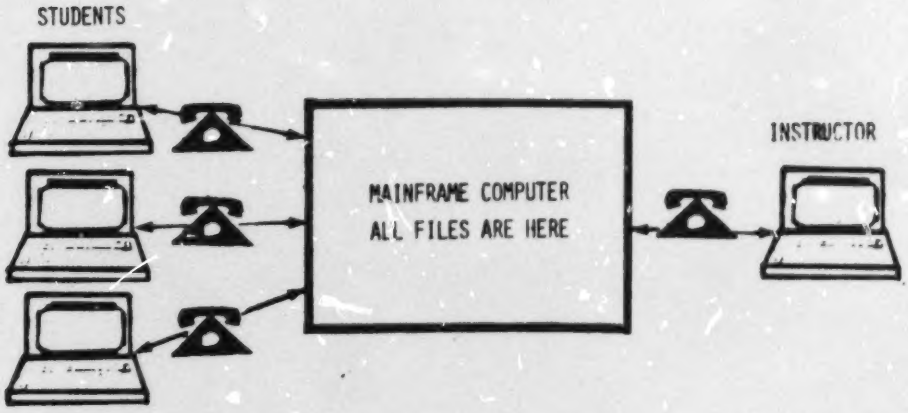

FIGURE 1

CADET NETWORK FILES
MICRO TO MAINFRAME

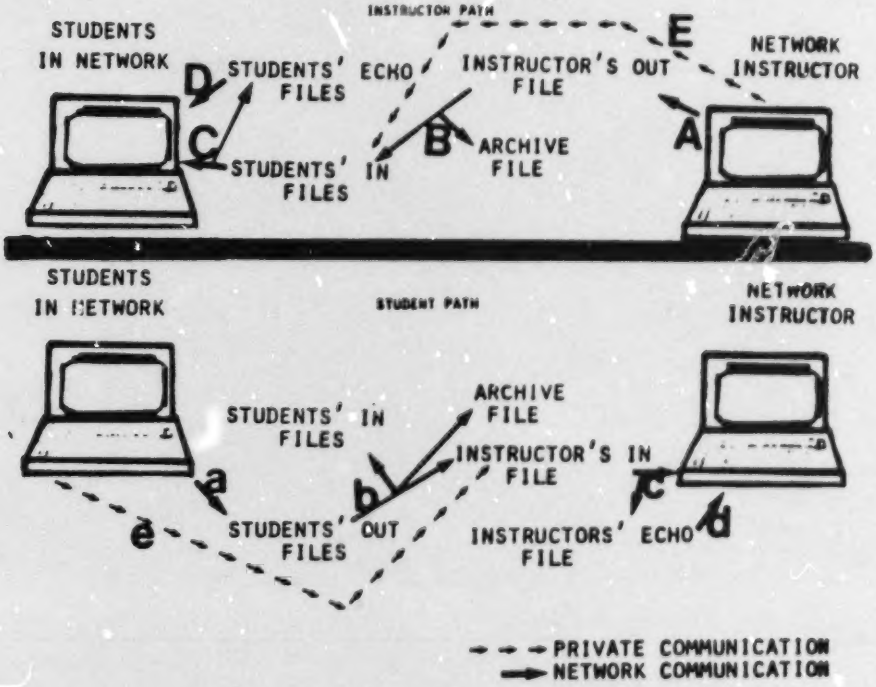

FIGURE 2

The new CADET system contains a bulletin board function for group discussions, and an electronic mail system for private communications between participants. A special "Archive" file keeps a record of all bulletin board communications. In order to avoid loss of data in case there is a problem downloading a message, each participant has an ECHO file that stores the last message before it is downloaded. While all other files for up and downloading automatically empty themselves ECHO never empties. Each new download message is written over the old one. So even if another problem arises in downloading ECHO, the message will not erase. Echo always holds the last message downloaded.

The new CADET system differs from the ones described in the previous report as being completely automatic. There is no longer any need to assign transmission times to the leader and participants, or for the leader to perform "housekeeping" chores in emptying the files daily. In the present field test, all files worked properly.

Participants were asked to try to communicate without using the Datapac system, but rather direct dial long distance telephone. Results were mixed. There were no problems encountered calling and up and downloading messages from Calgary and Grande Prairie. However, Lethbridge reported quite a bit of difficulty being repeatedly cut-off from the Amdahl. This may be due to voltage changes in the telephone lines between the different exchanges. Datapac was used without difficulties.

CADET Universal Feature

In order to determine if the CADET files can be used with other computers than the Apple, a 16k Radio Shack Color Computer equipped with a Colorcom E (Eigen Systems) communications plug-in rompack was used

to enter the CADET system. It was found that the CADET commands also functioned with the Color Computer. A file was up-loaded and sent to all member files. A file was also down-loaded and saved. It is of interest to note that in this test, the computer was equipped with a tape recorder and not a disk drive.

The implication of the above is that lower cost equipment more readily affordable by students can be used for a CADET network as an interactive Amdahl terminal, and that CADET commands and files can work with different brands of computers.

A caveat is in order. Before suggesting a variety of computer brands for a network, it should be understood that the software must be thoroughly tested and adequate instructions provided for participants. Provisions must also be made for differences between brands as to how they receive data. This is analogous in this project with the difference between the Apple II and the Apple IIE. The former cannot receive lower case letters for screen display whereas the latter has lower case capability.

Problems Encountered

1. Difficulty between different models of Apple computer occurred. When an Apple IIE is used it should be kept in Caps Locked position since the Apple II is unable to receive lower case letters unless it has a special card for this purpose.

2. The Apple IIE and Apple II have different key locations for certain symbols such as the double quotation mark. Since such symbols are located on keys with other symbols or numbers, reference should only be made the symbol in question and not to the symbol or number on the same key.

3. When a message is being sent to another participant and that participant is downloading his file, there will be a pause until the download is completed before a new message is inserted in the file. A precedence message will appear on the screen if that happens, and users should not abort the transmission.

4. Participants should be fully trained in the use of Apple computers before attempting to use the CADET system. This includes knowledge of which slot peripherals such as disk drive cards should be inserted.

5. Other serial cards than the one used with the modem should be removed. For example, one user had an Apple communications card driving a serial printer and the system would not communicate until this card was removed.

Recommendations

1. Field test the procedure using diverse communication programs and different text editors. Theoretically, if the main element is the up and downloading of information, there should be no problem with different communication programs and editors as long as access to the proper file is achieved.

2. An improvement in the communication program that would allow single key strokes to type in the source commands for the Amdahl and set the proper elements in the communications program. With this would be a user friendly procedure that would query the user about what to do and guide the user to do it.

3. A hands-on demonstration for those wishing to use the CADET procedure is advisable to develop some familiarity with the system before it is used.

A Review of CADET Advantages

An argument can be made that the Apple computer is capable of a stand alone network and electronic mail system without the need of a mainframe. Reasons favoring CADET use over such a system are:

1. Cadet permits the use of standard packet data switching for distance communications.

2. A micro computer is not needed to be "dedicated" to the network.

3. An in-house "dedicated" telephone line does not have to be used.

4. More than one user at a time can access the central computer files.

5. Mainframe memory is more secure from accidental erasures than micro memory.

6. Mainframe back-up files in case of accidental loss of data in downloading are easier to create and faster to work with.

7. The group leader can monitor files of participants faster and more efficiently on mainframe than on central micro.

8. The mainframe can be adapted to accept protocols from several different types of microprocessors for communications on the same network.

9. Larger mainframe memory permits more users to participate in a network.

10. The larger memory also allows more than one network to be operative.

Since CADET allows a user to prepare messages on diskette, as well as receive message saving them to diskette, computer time and telephone time are efficiently used. And since the user can access the mainframe at convenient times, without the other party on line at the same time, there is no problem of "telephone tag".

JMK/as
04/09/84

APPENDIX A

Visiterm Communications Between Amdahl and Apple

A. Dumb Terminal Communication:

1. Set Visiterm to full duplex unless Datapack is being used. With Datapack set Visiterm to half duplex.

2. Change Options page on Visiterm as follows:

   EOB CHAR = $0D RET

   ACK CHAR = $3E >

   STOP CHAR = $0A <J>

   START CHAR = $3E >

   CURSOR = +7

   Set the letter width to five + marks wide.

B. Up-loading to Amdahl from Apple

1. As above in A.

2. Set F page PROTOCOL to EOB-ACK.

C. Down-loading to Apple from Amdahl

1. As above in A.

2. Set F page PROTOCOL to STP-STRT.

The authors would like to thank Mr. Rick Roder, Faculty of Education Computer Laboratory Supervisor, for his aid in preparing the above information.

APPENDIX B

CADET READY REMINDER CARD

Sign on - #sig robin
Sign off - #sig $ or hang-up

Visiterm:

1. Terminal Page - Program boots to this page. Press T on Options Page or FILE Page to return to Terminal Page.
2. Options Page - On Terminal Page press ESC then hold down SHFT and 1 keys.
3. File Page - Go to Options Page and press F key.

Summary of Commands: (For User Robin)

1. To upload a message SOURCE GULL:ROBIN-UP
2. To send the message to others SOURCE GULL:ROBIN-SEND
3. To download a message SOURCE GULL:ROBIN-DOWN
4. To download ECHO file SOURCE GULL:ROBIN-COPY
5. To send leader confidential communication SOURCE GULL:PERSONAL
6. To use electronic mail SOURCE GULL:TOROBIN
   [send a message to Robin]

Sending a message:

Insert Text Editor diskette. TYPE:

SOURCE GULL:ROBIN-UP press RETURN, go to File Page, press RETURN until words FILE NAME have a white background, press arrow keys until file name appears, press S key. After message is sent go to Terminal Page, press both ESC and 1 key, pause and press RETURN. Then type SOURCE GULL: ROBIN-SEND and press RETURN (note - Visiterm sending protocol is EOB-ACK).

Receiving a message:

Insert Text Editor diskette. TYPE:

SOURCE GULL:ROBIN-DOWN do not push RETURN. Go to File Page, press RETURN until words FILE NAME have a white background. Press ESC key and type name of file to save message under. Press RETURN. Continue to press RETURN until PROTOCOL has a white background. Press arrow keys until PROTOCOL reaches STP-STRT. Push R key, pause, then RETURN. At end of message press ESC and 2 keys at same time.

Personal message:

Use "TO" file. To send to ROBIN type SOURCE GULL:TOROBIN press RETURN. Go to File Page, press RETURN until words FILE NAME have a white background, press arrow keys until file name appears, press S key.

APPENDIX C

SOURCE COMMANDS AND FILES

In the following commands and files, GULL is the Leader, and all files have been set up under GULL'S signon I.D. DOVE is the I.D. of one of the participants.

CADET SOURCE COMMANDS

A - Upload to mainframe:

```
SOURCE GULL:DOVE-UP
```

B - Send file to others and Archive file:

```
SOURCE GULL:DOVE-SEND
```

C - Download incoming message file from mainframe.

```
SOURCE GULL:DOVE-DOWN
```

D - Download echo file from mainframe:

```
SOURCE GULL:DOVE-COPY
```

E - Upload personal message only to Leader's incoming message file:

```
SOURCE GULL:PERSONAL
```

F - Upload electronic mail to any one CADET participant (in this case to ROBIN):

```
SOURCE GULL:TOROBIN
```

CADET SOURCE FILES

A - Upload to mainframe, file GULL:DOVE-UP

```
COPY *MSOURCE* TO GULL:DOVE2
```

B - Send file to others and Archive file, file GULL:DOVE-SEND

```
COPY GULL:DOVE2 TO GULL:GULL1(*L+1)
COPY GULL:DOVE2 TO GULL:LARK1(*L+1)
COPY GULL:DOVE2 TO GULL:CHAT1(*L+1)
COPY GULL:DOVE2 TO GULL:JAYS1(*L+1)
COPY GULL:DOVE2 TO GULL:IBIS1(*L+1)
COPY GULL:DOVE2 TO GULL:MYNA1(*L+1)
COPY GULL:DOVE2 TO GULL:ARCHIVE(*L+1)
EMPTY GULL:DOVE2 OK
```

In the above source command, DOVE is the user. Note that all users have their own source command for sending that does not include their own incoming message file. Thus, DOVE does not send anything to GULL:DOVE1 file.

C - Download incoming message file from mainframe, GULL:DOVE-DOWN

```
COPY GULL:DOVE1 TO GULL:DOVE-ECHO
COPY GULL:DOVE1
EMPTY GULL:DOVE1 OK
```

D - Download Echo file from mainframe, file GULL:DOVE-COPY

```
COPY GULL:DOVE-ECHO
```

E - Upload personal message only to Leader's incoming file, file GULL:PERSONAL

```
COPY *MSOURCE* TO GULL:GULL1(*L+1)
```

F - Upload electronic mail to any one CADET participant (in this case to participant ROBIN), GULL:TOROBIN

```
COPY *MSOURCE* TO GULL:ROBIN1(*L+1)
```

APPENDIX D

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THE CADET OPERATIONS MANUAL

Version 2

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The CADET system is a telecommunication link between microcomputer users who interact with each other using a mainframe computer. Thus, information and messages can be transferred among a group without the need to be at their telephones or computers at the same time. With CADET, each person in the system has two mainframe files for incoming messages and outgoing messages. These are activated with a few simple commands noted later in this discussion.

Your files in the Amdahl mainframe can be used daily, except Sundays, at any time other than 4:00 to 8:00 in the morning. Sunday hours are usually noon until 8:00 p.m.

Messages are prepared on a word processor Text Editor diskette, and are sent to your outgoing file where they are distributed to the other participants. Your Text Editor is also used to copy incoming messages and save them to diskette for future reference.

For communication with the Amdahl mainframe, the Visiterm program is used in conjunction with the California Communications Card and CAT telephone modem. All the above will be discussed in detail.

VISITERM

Now, try out the Visiterm program. Visiterm has three screen pages: the terminal page, the options page and the file page.

The terminal page is the first one - it appears blank except for some words at the bottom of the page. Here is where commands to the Amdahl are given and you sign-on and off.

The options page is next. You obtain it by first pushing ESC then holding down both SHFT and quotation mark key. This page contains communications data for Amdahl-Apple linking. You do not have to do anything with this page except use it to get to the file page.

Press the F key and you are now seeing the file page. This page is used with the text editor diskette to send and receive messages.

THE COMMUNICATION CARD AND TELEPHONE MODEM

The Card

Your communication card and telephone modem are connected by a cable. The card must be installed in your Apple. It is quite easy to do. Just unplug the computer, and remove the protective computer cover. Toward the rear of the computer are a series of seven slots. Any slot, except the one furthest to the left as you stand at the front of the computer, will work with the card.

First, look at the card and find a row of four dip switches. Only the number 2 switch should be down.

Second, ease the card into a slot with the copper "teeth" fitting into the slot. The long end of the card should be pointing to the front of the computer when it's installed.

Third, do not kink the flat cable. Gently lead it out through one of the narrow slots in the rear of the Apple. Re-fasten the case.

You have now turned your computer into a communications device.

The Modem

Your CAT telephone modem has two switches on one end. Make sure that both switches are to the extreme left position, as you are facing them. That is all that is needed to operate it.

Don't forget to plug in the modem's power source wire. It will not function unless it has its own supply of electricity.

When phoning a computer, wait for its whistle, and then place the telephone handset into the rubber cups with the mouthpiece in the cup nearest the cable and switches end. Press into cups.

When the modem is connected to electricity a dim red light will glow on its top. When the whistle signal is detected, a second red light will glow. Press RETURN a few times, and you will be in contact.

HOW TO ENTER DATAPAC

Call Datapac (300 baud rate number) _____. Press period key and then RETURN to activate Datapac once connection is made. Type Datapac Amdahl number 60100010 and press RETURN several times to activate Amdahl. When Amdahl # is seen type SIG _____ and then press RETURN. This is your sign-on. Then type in your password _____ and press RETURN. Note--on Datapac the place for the password will be blacked out for security.

When calling, wait for whistle and place phone in modem.

HOW TO SIGN ON TO AMDAHL

Boot the Visit[illegible] program.

The terminal page is set for Amdahl direct dial communication (full duplex). If you are using DATAPACK, press ESC then both SHIFT and double quote key. This will change the duplex to half duplex.

Call Amdahl. When Amdahl answers, there will be a distinct whistle. Place the receiver into the CAT telephone modem so that the telephone earpiece is on the rubber cup furthest from the CAT lead-in wires, and the mouthpiece on the other cup. Press-in.

Push RETURN once or twice and the Amdahl will request you to sign-on. Again push RETURN and a cross hatch sign will appear //.

Next to the // without making any spaces type in:

sig your sign-on

If your sign-on is ROBIN, it will look like this:

sig robin

Don't worry about upper or lower case letters. Just do not enter any additional spaces or any other characters.

Press RETURN, and the Amdahl will request your password. Type it next to the // sign. For security reasons, the password will not appear on the screen. Again press RETURN. If you have correctly entered your password, Amdahl will note your sign-on time. If you made a mistake in typing your password, Amdahl will request you again to enter the password.

Congratulations, you are now ready to send and receive messages.

RECEIVING A MESSAGE

After signing-on first replace the Visiterm diskette with the Text Editor diskette. Then enter the Amdahl command on terminal page next to the # sign.

source gull:your SIGN-ON

If your file name is robin then it will look this this:

source gull:robin-down

DON'T PUSH RETURN - YET!

Go to the File page of Visiterm (it is still in the computer memory):

1. When the white background is on FILE NAME in the upper left corner (push RETURN to get it there), push ESC. A curser will appear next to FILE NAME. Type in the name you wish to save this message under, and push RETURN. The white background will reappear on FILE NAME.

2. Again push return until the white background is behind the word PROTOCOL. Push the arrow keys until PROTOCOL changes from EOB-ACK to STP-STRT. (This is the Apple reception protocol. EOB-ACK is Amdahl's reception protocol.)

3. Push the R key and wait a few moments.

4. Push RETURN and any messages in your file will download and the file will empty itself. You will know the transmission is complete when an "empty file" statement appears on your screen.

4. At the end of transmission, press ESC and then 2 key and wait for the disk drive light to turn off. Your message (if any were in your file) are now saved to Text Editor diskette.

Using your back-up message file:

A possibility exists that after you begin downloading your messages, that voltage fluctuations or other problems could interfere with the reception. Once the downloading begins, the in-coming message file automatically empties itself. However, the message is not lost. There is a back-up file called ECHO that holds the last messages downloaded to your computer. It does not empty itself, but writes over what is in it. Should you need ECHO, the command to download is:

SOURCE GULL:YOUR SIGN-ON-COPY

For the user with ROBIN as a sign-on, the command would be:

SOURCE GULL:ROBIN-COPY

All the above is the same. ECHO will not empty when downloaded, but will hold the last message until you again download from your regular incoming message file.

HOW TO SIGN OFF AMDAHL

There are two ways:

1. Just hang-up.

2. Go to terminal page of Visiterm, and next to # sign type:

sig $

TEXT EDITOR

Try out the Text Editor. Boot the diskette and the editor menu appears. Select A) to write a message. Use ESC to return to the menu. S) will save the message under any name you chose. The menu is self-evident and very user friendly. Take a few minutes and experiment with the various commands to see what will happen.

Should you want to delete a message from the editor diskette, push both control and reset buttons and a blinking curser will appear. Type in the word CATALOG then push the RETURN key and the list of message files on your diskette will appear. Then type in DELETE next to the curser, and the name of the file to be deleted. When you push RETURN, the file will be deleted. Do not delete file HELLO since that is your text editor program.

To go back to the Text Editor program, type RUN and press RETURN.

TEXT FORMAT

Every message should begin and end with a row of asteriks, and have the name of the sender and date. The following is a sample:

```
1  ************************************************************
2  JOE KIRMAN, SEPT. 14, 1983
3  I HOPE THAT ALL OF YOU ARE ENJOYING THE CADET SYSTEM.
4  ************************************************************
5
```

Please note that the text editor can wrap around to a new line without the need to press RETURN. DO NOT WRAP AROUND.

End each line with a press of the RETURN key. If you wrap around characters can be lost.

OF SPECIAL IMPORTANCE

The first character of any new line after pressing RETURN should not begin with a numeral or any symbols such as punctuation or arithmetic ones. These will be read by the Amdahl as special commands, and your message may get botched.

Always prepare your message on the text editor diskette before you sign-on to Amdahl to send a message.

SENDING A MESSAGE

First, prepare a message on the text editor.

After signing on to Amdahl, type in the command:

SOURCE GULL:YOUR SIGNON-UP

and push the return key.

If for example, your sign-on is ROBIN, then your file is ROBIN and the command will look like this:

SOURCE GULL:ROBIN-UP

Don't worry if your command is in lower case type. Just don't make any additional spaces or add any other letters or symbols.

Once you have pushed the RETURN key a symbol will appear on the screen called an angle bracket. It looks like this > .

If you receive an error message, push RETURN and type in the command again.

When you get the > sign go to the file page. See if the words FILE NAME in the upper left have a white background. If not, push RETURN until the white background appears.

Now remove the Visiterm diskette and replace it with the Text Editor diskette. Push either arrow keys until the name of your message file appears, then push the S key.

Your file will begin to print out on the small screen.

When the file has been sent, push T to return to the terminal page. Push both ESC and 1 key, and then RETURN. A crosshatch sign will appear - #.

At this point you are ready to transmit your message to the other members of the CADET group, with the command SOURCE GULL:YOUR SIGNON-SEND.

If your sign-on is ROBIN, then it will look like:

SOURCE GULL:ROBIN-SEND

Don't worry about upper or lower case, just keep the spacing the same, and don't add anything else.

Remember - you write in a command to Amdahl next to the crosshatch sign #.

Don't sign off until Source File SEND stops.

CONFIDENTIAL COMMUNICATIONS

Should the need arise where confidential communication is required with the Team Leader please do the following:

1. Do not use the standard upload command e.g.,

SOURCE GULL:ROBIN-UP

2. Use instead:

SOURCE GULL:PERSONAL

SOURCE GULL:PERSONAL will send your message only to the Team Leader's file. Do not use the "send" command after it, e.g., SOURCE GULL:ROBIN-SEND, since your confidential message goes directly to the Team Leader's in-coming file and not to your distribution file.

FORMAT

The word "confidential" must be the first word in your message in order to alert the Team Leader to send the reply only to your in-coming file, e.g.,

```
1 ************************************
2 John Doe, September 15, 1983
3 CONFIDENTIAL - I AM CONCERNED ABOUT
4 SEVERAL PROBLEMS THAT MAY TAKE ME
5 AWAY FROM THE PROJECT.  WILL THERE
6 BE ANY DIFFICULTIES WITH
7 THIS?
8 ************************************
9
```

See Electronic Mail procedure on the next page.

ELECTRONIC MAIL

Personal communications can be sent directly to any member of the CADET network. This is done with the "TO" file command. Every member has a file with a TO infront of his or her sign-on identification. Thus user with signon ROBIN has a file called TOROBIN. By sourcing this file, your diskette message is sent only to ROBIN.

1. Do not use the standard upload command e.g., the -UP command.
2. Use instead:

   SOURCE GULL:TOROBIN

This will send your message only to ROBIN's file. Do not use the "send" command after it since your electronic mail goes directly to Robin's in-coming file.

Procedure -

1. First type in source command.
2. Push RETURN.
3. Go to File Page.
4. Press RETURN key until the words FILE NAME have a white background. Press arrow keys until file name appears at top of page.
5. Press S key.
6. Wait for message to be sent.
7. Then go to terminal page by pressing T key.
8. Press both ESC and 1 key, and then press RETURN.
9. You are now ready to sign-off or send or receive another message.

SOME COMMON PROBLEMS

1. Line voltage fluctuations - This is an electrical current condition that can cause the deletion of characters in a message being transmitted or even disconnect a user from Amdahl. Rural telephone lines are sometimes prone to this as are telephones that are on line with other telephones. When the other telephones are lifted they cause a voltage fluctuation. This is very common on telephones interconnected with different line buttons. That is, you can select one of several different lines by pushing a button on the base of the telephone - it usually has a selection of different numbers for the different lines. It makes no difference which line the other party selects, merely lifting the telephone will cause a voltage fluctuation.

2. Difficulty Signing on to Amdahl - This is usually due to heavy use at the time you ring the mainframe up. It appears as a very sluggish response to your commands, rather than the crisp, rapid response which is its normal operating procedure. It may also appear as no response at all from the mainframe. This can occur during lunch hour - a very heavy user period on weekdays. Try again at another time.

3. Problems in up and downloading - If it is not due to a sluggish response from Amdahl re #2, you have either probably not given the correct commands, or followed the procedures in this manual for up and downloading. Re-read the relevant sections and try again.

4. Wrong duplex - Users calling through Datapack should adjust the Visiterm program to half duplex (see signing on). Using the wrong duplex mode will result in not being able to get any response at all from the mainframe computer.

TROUBLE SHOOTING CHECK LIST

1. Computer is plugged into a working power source.
2. Telephone modem is plugged into a working power source.
3. Communications Card is in the proper slot.
4. Communications Card #2 dip switch is down, all others are up.
5. All cable connections between modem and Communications Card are secure.
6. Visiterm program has been booted.
7. Visiterm is in half duplex for Datapack (if Datapack is being used).
8. File page protocol is set for EOB-ACK for sending a message.
9. The correct command has been given for uploading to Amdahl, and the RETURN key pushed before file page has been entered.
10. The correct command has been given for downloading, and the RETURN key has been pushed on the file page only after a file name has been selected to save the message under, and the protocol STP-STRT has been selected, and the R key has been pushed.
11. After receiving a message, ESC and 2 keys have been pushed to close the file on the diskette.
12. In writing commands to the Amdahl, no extra spaces or characters have been added.
13. In preparing your message on the Text Editor, you did not start a new line (after hitting RETURN) with any character other than a letter.
14. You are using a telephone that is not connected to any other telephones.
15. The voltage in your telephone line is not fluctuating.
16. For sending and receiving messages, you have replaced the Visiterm diskette with the Text Editor diskette, after Visiterm has been booted.
17. The modem switches are all to the left as you face them.